

THE HINDU EXPLAINS

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Flu virus spread caused by influenza with human symptoms of fever infecting the nose and throat as deadly microscopic microbe cells with 3d illustration elements. | Photo Credit: [Getty Images/iStockphoto](#)

The story so far: Recently, the Central Drugs Standard Control Organisation recommended granting [permission for phase 1 human clinical trials for Bharat Biotech's nasal COVID-19 vaccine, BBV154](#). On its website, [Bharat Biotech said](#), "The nasal route has excellent potential for vaccination due to the organised immune systems of the nasal mucosa". Effectively, intranasal candidates have shown good potential for protection in animal studies conducted thus far.

An intranasal vaccine does exactly what it says it does — deliver a vaccine through a spritz through the nostrils. The advantages of this method of vaccine delivery over the injection and oral forms are quite apparent. The method comes with the guarantee of better compliance and the advantage of lower costs. But only clinical trials can determine whether such a vaccine with an easy delivery mechanism can be efficacious too.

Also read | [Bharat Biotech to collaborate with Washington University School of Medicine on COVID-19 nasal vaccine](#)

In August 2020, scientists at Washington University School of Medicine said they had developed a nasal vaccine that targets the SARS-CoV-2 virus. [Science Daily](#) reported the study published in *Cell*, a journal, specifying that the vaccine could be given in one dose via the nose and was effective in preventing infection in mice susceptible to the novel coronavirus. The investigators then revealed their plan to test the vaccine further on non-human primates and humans. "We were happily surprised to see a strong immune response in the cells of the inner lining of the nose and upper airway — and profound protection from infection with this virus," said senior author Michael S. Diamond, Herbert S. Gasser Professor of Medicine. "These mice were well protected from disease. And in some of the mice, we saw evidence of sterilising immunity, where there is no sign of infection whatsoever after the mouse is challenged with the virus."

The Washington University study, while doing a comparison, found that while a COVID-19 vaccine injection (at that stage) induced an immune response that prevented pneumonia, it did not prevent infection in the nose and lungs. Such a vaccine might reduce the severity of COVID-19, but it could not prevent infected individuals from spreading the virus, said the study.

A study published in [Science Direct](#) in December 2020 showed the pre-clinical efficacy of a lentiviral vector, delivered nasally, as a COVID-19 vaccine. The authors said targeting the immune response to the upper respiratory tract provides critical protection, and intranasal vaccination induces protective mucosal immunity against the SARS-CoV-2 in rodents. Given that the SARS-CoV-2 virus shows a proclivity to dwell in the upper respiratory tract for a prolonged period of time, a safe and efficacious nasal vaccine is well-placed to target the literal entry point of the virus into the body.

Earlier this month, researchers at Lancaster University working with the Biomedical Research Institute in Texas claimed they had administered two doses of a COVID-19 vaccine via a nasal spray in animals, and this had elicited robust antibodies and T-cell responses that were enough to be able to neutralise SARS-CoV-2.

So far, intranasal vaccination is being used only for influenza. However, it cannot be used on certain groups of people, particularly those who have compromised immune systems. *Science Daily* reports that “the new COVID-19 intranasal vaccine in the Washington University study does not use a live virus capable of replication, presumably making it safer”. The Bharat Biotech vaccine also rides on an adenovirus vector.

Dr. V.K. Paul, a neonatologist and member of the NITI Aayog, said, “It looks like an exciting development because potentially, yes, this route can be used to deliver the safe antigen against which an immunological response would happen. If it does work, it can be a game-changer because it is so easy to use and we look forward to this development.” AIIMS director Randeep Guleria recently commented in an interaction that if the nasal vaccine was approved, it will be easier to give. “In half-an-hour, you can vaccinate an entire class,” he said. The injectable vaccine being used now is not recommended for children.

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